Eco-Friendly Management of Insect Pests (*Chrysodeixis Acuta*) of Soybean (*Glycine max (L.) Merr.*) Through Varietal Screening in the Dewas District of Madhya Pradesh

Sandeep Singh Nagar
Asst. Professor
Department of Zoology (HOD)
PMCoE, SKP Govt College
Dewas, Madhya Pradesh, India
sandeepdna@gmail.com

H. S. Rathore
School of Studies in Zoology and Biotechnology
Ujjain (M.P.), India

S. N. Upadhyay
Prof & Head, Department of Entomology
Govt. Agriculture College
Indore, Madhya Pradesh, India

Abstract: We used a randomized block design (three replications) to test ten soybean varieties that farmers liked best to see how well they naturally resist the green semilooper, Chrysodeixis acuta. The pooled larvae per plant means showed clear differences between the entries. JS-97-52 had the fewest larvae per plant (0.48), while JS-335 had the most (2.94). Resistance classes based on field-relevant thresholds corresponded with post-hoc groups. The results support host plant resistance as a key part of IPM for the Dewas district (Malwa region). This means that less insecticide is needed without hurting production.

Keywords: Soybean, Chrysodeixis Acuta, Varietal Screening, Host Plant Resistance, Integrated Pest Management, Malwa Region, India

I. INTRODUCTION

Soybean (*Glycine max*) is important for India's food and protein security, but defoliating Lepidoptera, especially green semiloopers (*Chrysodeixis* spp.), can lower yields from time to time. Integrated pest management (IPM) puts ecology-based methods that are based on thresholds and keeping natural enemies safe at the top of its list (1–3). In this context, host plant resistance provides long-lasting, farmer-friendly pest control (4-6). We assessed widely cultivated Dewas (Malwa Region) varieties to pinpoint candidates exhibiting intrinsic resistance to *Chrysodeixis acuta* in field conditions.

II. MATERIALS AND METHODS

2.1 Site, crop care, and design-

The Dewas district (Malwa region) of Madhya Pradesh, India, was where the tests took place. Plots were 3.0 m × 2.25 m with 0.45 m between rows and a seed rate of 100 kg ha^{-1}. No insecticides were used to protect the plants, so natural pest pressure could show genetic differences (5,13). The experiment utilized a randomized block design (RBD) with three replications to address spatial heterogeneity (7).

2.2 Target pest and observations

The main pest was the green semilooper, *Chrysodeixis acuta*. We got pooled mean larvae plant^{-1} by doing the same thing over and over again at growth stages that were likely to be affected, following standard field entomology practices (3, 14).

2.3 Summarizing data and putting it into resistance groups-

We sorted the varieties from least to most infested and used Tukey HSD grouping letters to summarize the differences between pairs. We used pragmatic resistance classes to turn numeric differences into advice that could help us make decisions: ≤0.75 larvae plant^{-1} (R), 0.76–1.25 (MR), 1.26–2.0 (MS), and >2.0 (S). This is in line with screening adaptations for defoliating Lepidoptera (5).

Table 1. Soybean varieties screened under RBD (3 replications).

Sr. No.	Soybean Variety
1	JS-335
2	JS-72-44
3	JS-95-60

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4	JS-93-05
5	JS-97-52
6	JS-20-34
7	JS-20-29
8	NRC-7
9	NRC-37
10	NRC-86

III.**OUTCOMES**

Table 2. *Chrysodeixis acuta* larvae per plant by variety, categorized into Tukey groups (lower values signify higher resistance).

Variety	Larvae plant^{-1} (pooled mean)	Tukey group	Resistance class
JS-97-52	0.48	a	Resistant (R)
NRC-37	0.56	a	Resistant (R)
JS-95-60	0.58	a	Resistant (R)
JS-93-05	0.9	a	Moderately Resistant (MR)
NRC-7	1.12	b	Moderately Resistant (MR)
JS-20-34	1.43	b	Moderately Susceptible (MS)
JS-20-29	1.78	c	Moderately Susceptible (MS)
JS-72-44	2.29	c	Susceptible (S)
NRC-86	2.56	d	Susceptible (S)
JS-335	2.94	d	Susceptible (S)

Table 3: Resistance classification based on larvae plant^{-1} thresholds

Variety	Resistance class
JS-97-52	Resistant (R)
NRC-37	Resistant (R)
JS-95-60	Resistant (R)
JS-93-05	Moderately Resistant (MR)
NRC-7	Moderately Resistant (MR)
JS-20-34	Moderately Susceptible (MS)
JS-20-29	Moderately Susceptible (MS)
JS-72-44	Susceptible (S)
NRC-86	Susceptible (S)
JS-335	Susceptible (S)

Figure 1. Pooled mean larvae plant^{-1} by variety (sorted).

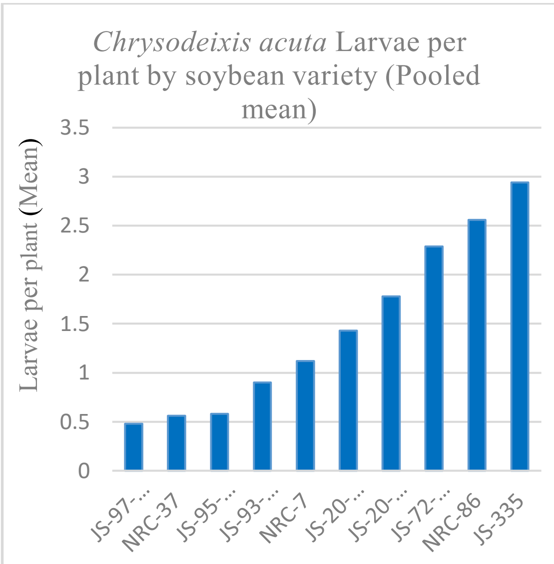


Figure 2. How post-hoc letters (Tukey HSD) are spread out among the different types.

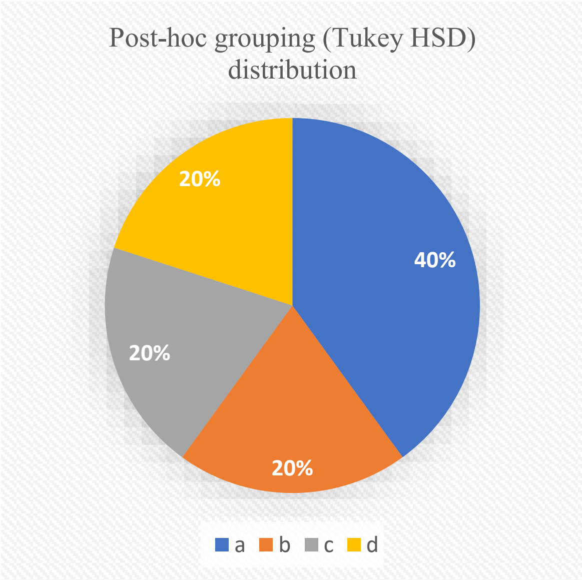
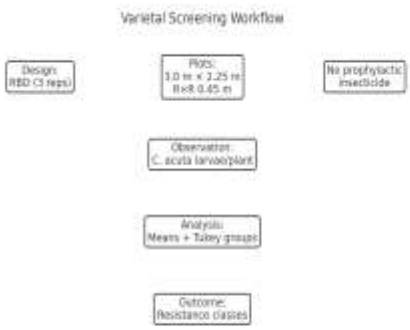


Figure 3. The steps in the varietal screening protocol.



Mean infestation ranged from 0.48 larvae plant^{-1} in JS-97-52 to 2.94 in JS-335 (Table 2; Figure 1). There were at least four clear statistical groups (a–d), which showed clear differences in genotype. The categorical classes (Table 3) make it easy to switch between analytics and advisory language for IPM (3). Promoting entries in the R/MR range can help keep yields stable while reducing the need for insecticides (8).

IV. DISCUSSION

This ranking fits into a larger pattern of host plant resistance, where antixenosis and antibiosis work together to make it harder for herbivores to survive (9). Putting resistant or tolerant entries in the field can cut down on the number of sprays, protect natural enemies, and slow down the development of resistance in pest populations (2,12). The protocol, which includes a non-prophylactic RBD and repeated scouting, is in line with the best way to screen for resistance (7). Future research may incorporate multiyear validation and explicit injury–yield relationships for local economic thresholds (10-11).

V. CONCLUSION

JS-97-52 was chosen as the best candidate for eco-friendly IPM in Dewas district (Malwa Region) because it had the fewest larvae (0.48 plant^{-1}). Promote varieties with ≤1.25 larvae plant^{-1} (R/MR), and keep a closer eye on entries with >2.0 (S) and take action as needed. Host plant resistance is still a useful, scalable way to cut down on the need for insecticides without hurting soybean yields (1).

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Conflict of Interest: The corresponding author, on behalf of second author, confirms that there are no conflicts of interest to disclose.

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